results of treatment, during the past year. The case showed wonderful improvement and elicited most interesting discussion.

Reports from the society officers were received and filed.

Dr. Ethan H. Smith was granted, on his request, transfer credentials, having removed to San Francisco.

The next meeting of the society will be held Wednesday evening, January 17, 1906, at the parlors of the St. James Hotel, San Jose, at 7 P. M. This session will be a business session with no scientific program, in order that the business of the society that has been accumulating may be disposed of without further delay. Recommendations of the officers and committees relative to adoption of new Constitution and By-Laws, consideration of the proposed Fee Bill, and other important matters are to be discussed. An adjourned meeting will be held in Palo Alto on Saturday evening following, January 20, 1906, at which a rich literary program will be furnished. This meeting will be under special charge of the Palo Alto members. The meeting has been set for Saturday night, so that members from San Jose and vicinity may return on midnight train.

A. E. OSBORNE, Secretary.

Santa Barbara County.

At a regular meeting of the Santa Barbara County Medical Society, held December 18, 1905, the following resolution was unanimously adopted, viz:

Resolved, That a vote of thanks be extended by the Santa Barbara County Medical Society to the editors of *Collier's Weekly*, *Journal of the American Medical Association* and the CALIFORNIA STATE JOURNAL OF MEDICINE, for the bold and effective work in enlightening the public and profession on the Patent and Proprietary Medicine evil. The secretary to communicate a copy of this resolution to each.

* * *

The Santa Barbara County Medical Society held its annual meeting for the election of officers in the parlor of the Arlington Hotel, January 8, 1906. The meeting was called to order by the president, Dr. William H. Flint, the secretary, W. B. Cunnane, at his desk.

After the reading of the minutes of previous meeting the election of officers for the ensuing year was declared in order and balloting brought the following results: President, W. B. Cunnane; vice-president, David A. Conrad; secretary, William T. Barry; treasurer, C. S. Stoddard.

On motion a vote of thanks was extended the retiring officers.

Refreshments and adjournment followed.

WILLIAM T. BARRY, Secretary.

Sacramento Society for Medical Improvement.

Regular monthly meeting called to order by President Twitchell, December 19, 1905, twenty members present.

A communication from the Secretary of the State Society relative to the law forbidding advertising of "grossly improbable statements," was received and filed.

A set of resolutions offered by Dr. W. A. Briggs, relative to the "nostrum" evil was, in the absence of the author, laid over for action at the next meeting.

Dr. F. G. Fay of Sacramento, having made application for membership according to the form recommended for such applications by the A. M. A. and the Secretary reporting that Dr. Fay's credentials were satisfactory, i. e., a diploma from the Bennett College of Eclectic Medicine and Surgery issued March, 1886, and a California State license of October, 1886, a ballot was taken and Dr. Fay duly elected a member of this society.

Dr. S. E. Simmons reported, and showed photographs of a case of myxedema and presented before the society a male adult patient of powerful physique, 204 lbs. weight and gaining, for diagnostic commentary as he was apparently developing tuberculosis of the dorsal spine.

Drs. Wright and Wilder reported cases of pneumonia treated with massive doses of quinine.

A general discussion followed on the interpretation and enforcement of the quarantine regulations as applied to scarlet fever.

E. M. WILDER, Secretary.

COOPER SCIENCE CLUB.

(Concluded from page 27, Vol. IV, No. 1.)

"The Development and Comparative Anatomy of the Pectoral Muscles" was expounded by Dr. Blaisdell in his paper as follows:

In giving a resumé of the development of the pectoral muscles it is proper to commence with the development of the mesoderm. If a transverse section of the bilaminar blastoderm of a chick be studied, and this section should be made through the primitive streak, it will be observed that the cells at the side of the streak are undergoing proliferation, and if an examination of a section of a slightly older blastoderm be next viewed, it will be observed that these cells have increased and extended laterad between the ectoderm and entoderm, and besides, they will be found to be closely associated with the entoderm, as can be exhibited by a series of older embryos. The entodermal cells undoubtedly multiplying and being cast off by a process of delamination, the mesoderm, therefore, having a double origin, but chiefly from the entoderm. It must be borne in mind that other embryonic structures are developing at the same time, especially the neural canal; the mesoderm is extending cephalad along the sides of the anlage of the central nervous system as well as laterad and caudad.

As development of the mesoderm proceeds, it will be observed to be thickest along the sides of the neural canal and thinning laterad, constituting, respectively, the paraxial and lateral plate of the mesoderm.

By the appearance of a horizontal cleft in the lateral plate, the mesoderm becomes divided into two laminæ—the outer or somatic, by union with the surface; ectoderm constitutes the somatopleure. The inner, or splanchnic, by union with the entoderm, constitutes the splanchnepleure.

The mesodermal cells touching this cleft cavity or primitive celom take on an epithelial character and become the mesothelial cells. The ectoderm and entoderm are epithelial from the beginning, the mesodermal cells acquiring an epithelial character. If the series of sections already referred to be studied, it will be seen that the mesodermic cells are at first distinct; that they soon form a cellular network, and then differentiate into the mesothelium and certain cells which migrate out of the mesothelial area and become more distant from each other, but connected together by protoplasmic processes and to the mesothelium, constituting the mesenchyma. The spaces between the cells are filled by a protoplasmic intercellular substance. It is possible that all of the mesodermal cells are first tranformed into mesothelium and then partly into mesenchyma.

During the third week in the human embryo the paraxial mesoderm undergoes segmentation by the appearance of transverse clefts. This occurs first in the cervical region, and by this segmentation a series of quadrangular bodies or mesoblastic somites will be observed along the sides of the neural canal when the embryo is viewed dorsally and from the surface. This segmentation proceeds gradually caudad. At the same time an intermediate mass of mesoderm is

differentiated between each mesoblastic somite and the walls of the celom to constitute the nephrotome, and is primarily concerned in the development of the excretory organs of the embryo.

A study of the development of the mesoblastic somites would best be pursued by making use of some of the lower members of the phylum chordata, typically the amphioxus, where there is a distinct bilateral outpouching of the mesothelial mesial wall of the celom into the mesoblastic somites of each body segment. By this process a portion of the celomic wall becomes pinched off and enclosing a cavity. Therefore, each mesoblastic somite contains a closed cavity, the walls of which are mesothelial, and constitutes the myotone, the cavity the myocele. It is probably proper to homologize those with similar structure in the mesoblastic somites of the highest vertebrates. The somites of the earliest human embryos contain a closed myocele which early becomes closed by proliferating cells. The myotome is separated from the neural canal by a mass of mesenchyma, which differentiates into the meninges and vertebra of each segment and constitutes the sclerotome.

The myotome consists of an outer and an inner layer, the two passing into one another at the dorsal and ventral edges and are in close contact with each other as development proceeds. The outer layer stains more deeply than the inner, and is the cutis plate, or dermatome, being concerned in the development of the corium of its own segment. The inner plate is the muscle plate, or myotome proper, and develops the musculature of its own segment. Note that the myotome is mesothelial in origin and develops voluntary muscle, which are often spoken of as mesothelial muscles as distinguished from the involuntary or mesenchymal muscles. As each myotome grows dorsally it also extends ventrad between the dematome and somatic mesoderm. As the myotomes develop, each receives a nerve supply from the nerve of its own segment, so that it is possible to trace the history of a myotome by its nerve supply, no matter what changes it may undergo; e. g., the serratus magnus is supplied by the posterior thoracic nerve, which arises from the fifth, sixth and seventh cervical nerves, and therefore is developed from the fifth, sixth and seventh cervical myotomes.

Each myotome may undergo any of the following changes:

By fusion to form a single muscle, as e. g., the serratus magnus from three myotomes.

By longitudinal splitting, as in case of the sternomastoideus and trapezius.

By horizontal splitting, as in case of the external and internal oblique and transversalis muscles of the abdominal wall.

By migration, as in case of the serratus magnus.

By degeneration as a whole or in part to form aponeurotic sheets, e. g., the aponeuroses of the abdominal muscles.

By change of direction of the muscular fibres, as in case of the three abdominal muscles already named.

One or more of these changes may occur in the development of a single muscle.

The limbs begin to develop in man about the twenty-first day of development as buds that grow out from the sides of the body and from several segments, as indicated, from the nerve supply to the myotomes, the latter growing out in the dorsal part of the bud and around the distal part to return to the body in the ventral part of the bud, so that several myotomes form a covering for the mesenchymal core of each bud. The myotome, or muscle-plate, is in turn covered by the dermatome or corium-plate superficially. But let it be borne in mind that the mesenchymal core develops into the skeleton and ligaments of the limb.

The myotomes of the upper or fore-limb bud grow ventrad to reach the midventral line, the ventral myotomic sheet undergoing one or more of the changes already indicated undoubtedly differentiates into the following: a cephalic portion gains a firm attachment to the developing sternum; a caudal portion that migrates dorsad to gain attachment to the thoracic and lumbar vertebral spines, and an intermediate portion which does not gain any firm attachment.

The sternal portion constitutes the pectoral mass from which the pectoral muscles have their origin, and are to be considered as intrinsic appendicular muscles. The latissimus dorsi is to be regarded similarly, but having gained a dorsal attachment, the intermediate portion develops the panniculus carnosus so well observed in many quadrupeds and attached to humerus by an axillary arch, as in the dog, horse, etc., it being that thin muscular sheet by which they shake the skin over the sides of the body, and so strongly developed in the hedgehog (musculus orbicularis) and ornithorbynchus.

By the nerve supply to the pectoralis major we are enabled to state that it was developed from the fifth, sixth and seventh cervical myotomes; the pectoralis major from the first dorsal myotome; the subclavius from the fourth and fifth cervical myotomes; the latissimus dorsi from the fifth and sixth cervical myotomes.

I wish to interpolate at this point that I consider that the sterno-cleido-mastoideus, trapezius, deltoid, levator anguli scapulæ and rhomboidei muscles are developed from the dorsal parts of the appendicular myotomes, and by a little study can be correlated segmentally with the ventral sheet.

Comparative anatomy aids us in understanding the evolutionary development of the pectoral muscles in man, and this through the study of the primate group, viz.: lowest or quadrupedal primates, lemurs and marmosets; the lower monkeys; lastly, the anthropoid apes (orang, gibbon, chimpanzee and gorilla); man, the highest primate.

The pectoral mass consists of two layers—a superficial or ectopectoral (pectoralis major), and a deep or entopectoral (subclavius, pectoral minor). At this point recall the origin and insertion of the pectoral muscles in man, the twisted condition of the pectoral major at insertion, and its three portions—clavicular, costo-sternal and abdominal, the former having the lowest insertion at humerus, the latter the highest.

In the lemur *(Nycticebus tardigradus)* the deltoid is attached to the outer third of the clavicle. The ectopectoral layer has no clavicular attachment, but is attached to the midline of the sternum, the abdominal portion uniting the two planes at their caudal margins, and is interesting as being a common non-differentiated origin of the ecto- and entopectoral layers. The pectoralis minor and subclavius arise from the sternum under cover of the pectoralis major. The subclavius is broad and the pectoralis minor is rather rudimentary. A ventro-lateral thoracic panniculus is present and is attached by a well developed axillary arch which crosses the latissimus dorsi without having a direct connection with it, which, joining the abdominal non-differentiated portion, is inserted under cover of the deltoid into the lateral tubercle of the humerus and lateral surface of the shaft of the same.

In the common marmoset *(Hapale jacchus)* the pectoralis major is free *at its caudal margin* and attached to the sternum, as in the lemur, and the pectoralis minor is almost continuous with the subclavius and is attached to sternum as in the lemur. There is no panniculus as a distinct layer, but it would appear as if it had been shifted ventrad to constitute an abdominal pectoral, having the same relation to the pectoralis minor at insertion as in the lemur. There

is a distinct intermediate entopectoral slip between the caudal border of the pectoralis minor and the cephalic margin of the abdominal pectoral. The deltoid is attached along clavicle ventrad to the sterno-clavicular articulation.

In the sacred monkey (*Semnopithecus Entellus*) the pectoralis minor has shifted further laterad to side of sternum and some attachment to the costal cartilages, and has also moved somewhat cephalad. The abdominal pectoral is present. The axillary arch is more adherent to the latissimus dorsi and all three are inserted higher up on the humerus. In the black-backed Macaques monkey (*Macucus melanotus*) the axillary arch is more adherent to the latissimus and otherwise characters as in the sacred monkey, but less marked.

In the baboons there is a complete differentiation of the pectoralis major and minor, and there is a wide interval between the latter and the abdominal pectoral. The pectoralis minor is inserted higher up on the humerus.

In the orang (*Simia satyrus*), as a representative of the anthropoid apes, the pectoralis major has shifted laterad to costal cartilages and edge of sternum. The abdominal pectoral has united to the major, except near insertion. There is a clavicular portion to the major. The three elements are separate at insertion into humerus and show the origin of twisting of the pectoralis major tendon in man. The pectoralis minor has shifted to the costal cartilages and at insertion has gained the coracoid process of the scapula. The subclavius has also shifted laterad to the costal cartilage of the first rib. No panniculus is evident, and there is a complete disappearance of it except as an individual variation in man and the anthropoid apes.

It will be observed that in the quadrupedal primated there is no clavicular division of the pectoralis major and that this muscle is attached to the mid-line of the sternum, and that the pectoralis minor is also attached wholly to the sternum, and the less differentiated condition of the two pectoral layers and the pannicular characters should be carefully noted. The characters presented by the lemur and marmoset are of the primary type.

In the lower monkeys the characters constitute an intermediate or transitional type, and will be observed in the tendency to shift laterad of the pectoral layers on sternum to costal cartilages and also of a shifting cephalad along humerus of the pectoralis minor, the well developed axillary arch and tendency to abort by union with latissimus in the higher forms of the present type. In the baboon the pectorals are well differentiated, and a wide interval between pectoralis minor and abdominal pectoral. In the highest or secondary type the pectoralis minor has gained a clavicular portion by a shifting ventrad along clavicle of a portion of deltoid, as indicated by it occasionally being supplied by the circumflex nerve. The abdominal pectoral has united with the costo-sternum pectoral, the latter being the true pectoralis major. The pectoralis minor has origin from costal cartilages and insertion into coracoid process of scapula. The axillary arch is obsolete except as a variatim or as a rudiment in floor of axilla as a partial boundary to the foramen of Landers.

The abnormal muscles (in pectoralis minimus and costo-coracoideus) in man can be readily explained as persistent parts of the panniculus plane, and are but atavistic reversions to a phyllogenetic structural condition, such conditions being normal to allied species.

The resumé was illustrated by charts, blackboard drawings, microscopical sections and dissections.

The works of Hartman, Bischoff, Huxley, Heisler, McMunich, Minot and Geo. Huntington in *Journal of Anatomy* were drawn upon and some original work.

PUBLICATIONS.

International Clinics. Fifteenth Series, Vol. II.—Philadelphia, the J. B. Lippincott Company.

The present volume of this series is up to the usual standard, and contains the following papers:

Treatment. The Treatment of Nephritis in Childhood, by John Lovett Morse; the Therapeutic Indications of Kephir, by G. Hayem; Some Observations on the Treatment of Pulmonary Hemorrhage by Adrenalin Chlorid, by D. Barty King; Suggestions Regarding the Treatment of Neurasthenia, by Robert T. Edes; X-Ray Treatment of Tinea Tonsurans, by Sabouraud and Noire.

Medicine. Diagnosis of Incipient Thoracic Tuberculosis, by Robert N. Wilson; Uremic Psychosis, Multiple Gastric Ulceration and Diabetes Mellitus, by Solomon Solis Cohen; Galloping Typhoid, by H. Roger; Plague, by J. R. Williamson; Seasickness, by A. L. Benedict.

Surgery. Pathology and Treatment of the Hernias of Children, by Edred M. Corner; Injuries of the Prostate Gland, by G. Frank Lydston; Enlargements of the Testis and Epididymis, by Daniel N. Eisendrath; Acute Purulent Generalized Meningitis, by Lermoyez and Bellin; Intracapsular Fractures and Dislocations at the Hip Joint, by Thos. H. Manly; Traumatism as an Etiologic Factor in Infectious Diseases of the Bones and Joints, by Charles Green Cumston; Sarcoma of the Gluteal Region, by J. Garland Sherrill; Use of Scopolamin as a General Anesthetic in Surgery, by Felix Terrier.

Gynecology. Rational Therapy of Uterine Displacements, by Chauncey D. Palmer.

Ophthalmology. Clinical Significance of Exophthalmos, by Mary Buchanan.

Rhinology. Suppurative Diseases of the Accessory Sinuses of the Nose, by Norval H. Pierce.

Physiology. Ehrlich's Side-Chain Theory in Its Application to the Physiology of Digestion, by J. C. Hemmeter.

Pathology. Chromaffin System, with Special Reference to Addison's Disease and Status Thymicus, by Josef Wiesel.

A Hand-Book of Nursing.—Revised edition. Published under the direction of the Connecticut Training School for Nurses. Philadelphia, J. B. Lippincott Company.

This work was originally issued in 1878, and since that time it has passed through several editions and revisions. It is the work commonly known as the "Connecticut Hand-Book of Nursing." The present edition seems to have been considerably revised.

Chloride of Zinc as a Deodorant, Antiseptic and Germicide.—By T. B. McCLINTIC. Bulletin No. 22, U. S. P. H. and M. H. Service.

The conclusion of the monograph is that "Zinc chloride has some properties as a deodorant to recommend it favorably, but its antiseptic and germicidal powers are comparatively feeble, which, with its cost and caustic properties, practically eliminate it from the useful and reliable disinfectants."

University of California Publications.—Physiology. Vol. 2, No. 17. On the Influence of Electrolytes upon the Toxicity of Alkaloids. (Preliminary Communication).—By BRAILSFORD ROBERTSON.

Vol. 3, No. 1, On Chemical Methods by which the Eggs of a Mollusc (Lottia Gigantea) Can Be Caused to Become Mature.—By JACQUES LOEB.

Transactions of the 13th Annual Meeting of the Hawaiian Territorial Medical Society, Honolulu, Nov., 1904.

Physicians' Pocket Account Book.—By J. J. TAYLOR, M. D. Published by the Medical Council, Philadelphia.

The Work of the Interstate Commerce Commission. By H. T. NEWCOMB.